

**WHAT IS CLAIMED IS:**

1. An isolated oral bacterial polypeptide which has amidolytic activity for cleavage of a nondenatured human  $\alpha_1$ -proteinase inhibitor at a reactive site loop region of the inhibitor.
2. The isolated polypeptide of claim 1 wherein the polypeptide has amidolytic activity in a solution comprising about 1 mM to about 500 mM Tris, about 500  $\mu$ M to about 100 mM cysteine maintained at a pH of about 7 to about 8.
3. The isolated polypeptide of claim 1 which is isolated from *Porphyromonas gingivalis*.
4. The isolated polypeptide of claim 1 which is a cysteine proteinase.
5. The isolated polypeptide of claim 1 which has a molecular weight of about 70 kD to about 80 kD as determined by gel filtration.
6. The isolated polypeptide of claim 1 which cleaves the reactive site loop region of the inhibitor represented by SEQ ID NO: 4 between glutamine and alanine.)
7. The isolated polypeptide of claim 6 which cleaves the reactive site loop region of the inhibitor represented by SEQ ID NO: 4 between phenylalanine and leucine.
8. An isolated polypeptide which is an oral bacterial cysteine proteinase and has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of the serpin.

9. The isolated polypeptide of claim 8 wherein the polypeptide has amidolytic activity in a solution comprising about 50 mM Tris, about 20 mM cysteine maintained at a pH of about 7.4 at 37°C.
10. The isolated polypeptide of claim 8 which is isolated from *Porphyromonas gingivalis*.
11. An isolated polypeptide which is isolated from *Porphyromonas gingivalis* and has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of the serpin.
12. The isolated polypeptide of claim 11 wherein the polypeptide has amidolytic activity in a solution comprising about 1 mM to about 500 mM Tris, about 500  $\mu$ M to about 100 mM cysteine maintained at a pH of about 7 to about 8.
13. The isolated polypeptide of claim 11 which has a molecular weight of about 70 kD to about 80 kD as determined by gel filtration.
14. The isolated polypeptide of claim 13 comprising an amino acid sequence having a percentage amino acid identity of greater than 37% to that of amino acid 148 to amino acid 843 of SEQ ID NO: 1.
15. The isolated polypeptide of claim 14 comprising an amino acid sequence having a percentage amino acid identity of greater than 52% to that of amino acid 148 to amino acid 629 of SEQ ID NO: 1.
16. The isolated polypeptide of claim 11 which cleaves a target polypeptide nonspecifically.
17. An isolated polypeptide comprising an amino acid sequence having a percentage amino acid identity of greater than 37% to that of SEQ ID NO: 1.

18. An isolated polypeptide comprising an amino acid sequence represented by SEQ ID NO: 1, an active analog or an active fragment thereof.
19. An isolated polypeptide comprising an amino acid sequence having a percentage amino acid identity of greater than 37% to that amino acid 148 to amino acid 843 of SEQ ID NO: 1
20. An isolated polypeptide comprising an amino acid sequence represented by amino acid 148 to amino acid 843 of SEQ ID NO: 1, an active analog or an active fragment thereof.
21. An isolated nucleic acid fragment encoding an oral bacterial polypeptide which has amidolytic activity for cleavage of a nondenatured human  $\alpha_1$ -proteinase inhibitor at a reactive site loop region of the inhibitor.
22. An isolated nucleic acid fragment encoding a polypeptide which is an oral bacterial cysteine proteinase and has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of the serpin.
23. An isolated nucleic acid fragment encoding a polypeptide which is isolated from *Porphyromonas gingivalis* and has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of the serpin.
24. The isolated nucleic acid fragment of claim 23 wherein the nucleic acid has a nucleotide sequence comprising SEQ ID NO: 2.
25. The isolated nucleic acid fragment of claim 23 wherein the encoded polypeptide comprises an amino acid sequence having a percentage amino acid identity of greater than 37% to amino acid 148 to amino acid 843 of SEQ ID NO: 1.

26. The isolated nucleic acid fragment of claim 23 wherein a complement of the nucleic acid fragment hybridizes to SEQ ID NO: 2 under hybridization conditions of

0.5 M phosphate buffer, pH 7.2, 7% SDS, 10 mM EDTA, at 68° C, followed by three 20 minute washes in 2x SSC, 0.1% SDS, at 65° C, wherein at least about 15 nucleotides of the complement hybridize.

27. A method for identifying an inhibitor of a polypeptide which has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of a serpin comprising isolating an agent that inhibits the amidolytic activity of the polypeptide by incubating the polypeptide with the agent under conditions that promote amidolytic activity of the polypeptide and determining if the amidolytic activity of the polypeptide is reduced relative to the amidolytic activity of the polypeptide in the absence of the agent.

28. The method of claim 27 wherein the polypeptide is isolated from *Porphyromonas gingivalis*.

29. An immunogenic composition comprising a polypeptide which has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of a serpin that is capable of eliciting antibodies in an animal.

30. A composition comprising an inhibitor to a polypeptide which has amidolytic activity for cleavage of a nondenatured serpin at a reactive site loop region of a serpin isolated from an oral bacterium.

[illegible]